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NOTE ON THE SPECTRAL TYPE AND THE RADIAL  
VELOCITY OF BARNARD'S PROPER  
MOTION STAR.

We have obtained spectrograms of Barnard's proper-motion star (R. A. =  $17^h 54^m$ , Decl. =  $+4^\circ 27'$ ) with the 36-inch refractor, the collimator section of the original Mills spectrograph, a  $60^\circ$  prism of light flint, and a 6-inch camera, on Seed 30 plates, as follows:

Gr. M. T.	Exposure	Observers
1916 June 19.845	$7^h 20^m$	Campbell & Moore
July 31.813	6 55	Shane & Paddock

The length of spectrum is 6 mm. from calcium K to hydrogen H $\beta$ . One mm. at H $\gamma$  corresponds to 154 angstrom units.

The first exposure recorded the spectrum in measurable strength from 4390A to the red of H $\beta$ , and showed that the type is Class Mb. The second exposure recorded the star spectrum to 4000A as the violet limit, and in measurable intensity from 4300A to about 5000A. To enable us to measure the displacements of the lines and bands on the Hartmann spectro-comparator, we photographed the spectrum of *a Herculis* (R. A. =  $17^h 10^m$ , Decl. =  $+14^\circ 5$ , Class Mb, known radial velocity —32 km./sec.) with the same instruments.

The results of the measures for radial velocity are, with reference to the solar system:

1916, June 19	Measurer
—134 km./sec.	Campbell
—104 “	Moore
—114 “	Moore
—117 “	Weight 1/2
1916, July 31	Measurer
—149 km./sec.	Campbell
—123 “	Moore
—131 “	Moore
—134	Weight 1
—128 km./sec.	Weighted mean

The first plate is given half weight because the seeing was poor, there was some interference from clouds, and the Moon's light (four days past the full) may have affected the plate very slightly.

A comparison of the spectrograms of  $\alpha$  *Herculis* and Barnard's star shows general agreement of spectral class, but discordances in the relative intensities of several absorption lines. We note the following differences:

Line	In $\alpha$ <i>Herculis</i>	In Barnard's star
4227 Ca	very strong	much weaker
4435 Ca	strong	stronger
4455 Ca	strong	much stronger
4535 Ti	strong	stronger
4395	fairly strong	apparently weaker
4404	fairly strong	apparently weaker

The differences described are apparently the indications, according to Adam's discovery, that  $\alpha$  *Herculis* is a "giant" star at a great distance from us and Barnard's star a "dwarf" comparatively near us. A 20-hour exposure on the spectrum of Barnard's star, using a 16-inch camera in combination with the  $60^\circ$  prism, would probably permit a valuable estimate of the parallax of the star to be made, by the Adams method; but unfortunately the requirements of our other programs prevented the devotion of twenty hours to this purpose.

Assuming that the B. D. star  $+4^\circ.3560$ , which follows Barnard's star by 9 seconds of time, has visual magnitude 8.7, the visual magnitude of Barnard's star must be approximately  $10\frac{1}{2}$ . Taking the color index of stars of spectral class Mb to be 2, the photographic magnitude of Barnard's star is therefore about  $12\frac{1}{2}$ .

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PRELIMINARY REPORT ON THE DETERMINATION OF THE  
LONGITUDE OF THE STUDENTS' OBSERVATORY BY  
WIRELESS SIGNALS FROM ARLINGTON.

In the spring of 1914, while Washington and Paris were conducting their longitude campaign by exchange of wireless signals between Arlington and the Eiffel Tower, an attempt was made to determine the difference in longitude between the Students' Observatory at Berkeley and the U. S. Naval Observatory at Washington by intercepting the Arlington signals.